963,752

# PATENT SPECIFICATION 963,752

DRAWINGS ATTACHED.

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International Classification :—G 06 k.

COMPLETE SPECIFICATION.

## Data Sensing Apparatus.

We, INTERNATIONAL BUSINESS MACHINES CORPORATION, a Corporation organized and existing under the laws of the State of New York, United States of America, of 590 Madison Avenue, New York 22, New York, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to data sensing apparatus.

According to the invention, we provide data sensing apparatus for sensing data recorded in the form of holes in discrete areas of a sheet, in which the sheet passes a row of sensing pins which closely engage the holes and are moved thereafter by the sheet whereby the data is sensed by determining the position of the pins when the sheet reaches a predetermined location.

In order that the invention can be fully understood, a preferred embodiment thereof will now be described with reference to the accompanying drawings, in which: —

Figure 1 is a perspective view of the badge-reading apparatus showing a badge in the badge receiver;

Figure 2 is a perspective view of the badge-reading apparatus in an opened position;

Figure 3 is an exploded perspective view of the column commons conductor array, the digit commons conductor array and slider assembly;

Figure 4 is a facsimile showing of a typical badge which may be read by the badge-reading apparatus; and

Figure 5 is a schematic showing of the badge latching mechanism.

### GENERAL DESCRIPTION

The instant invention concerns a novel badge-reading apparatus capable of reading a badge, column by column, in sequence while the badge remains locked in the reading position. The badge-reading apparatus is provided with a badge receiver into which badges can be inserted manually one at a time.

The badge which is to be read by the reading apparatus of the instant embodiment of the invention is capable of storing ten characters of data. A portion of the badge is subdivided into vertical columns and horizontal rows or index point positions. Data is recorded in the badge by means of selectively punched holes in index positions of the columns of the badge.

The badge sensing mechanism comprises a plurality of slider assemblies, one for each vertical column of the badge. As a badge is inserted into the badge receiver, a hole sensing projection on each of the slider assemblies senses for a hole in a corresponding column of the badge. As a hole sensing projection encounters a hole in the badge, the slider assembly will move with the badge until the badge is stopped in its fully inserted or badge-reading position. A latch mechanism serves to lock the badge in the reading position. The badge reader includes two arrays of electrical conductors. One array has a plurality of conductive elements arranged in parallel and corresponding to the data columns of the badge which are referred to as column commons. The other conductor array has a plurality of conductive elements, one for each of the digits 0 through 9, arranged in parallel and disposed at right angles with respect to the column commons. Bifurcated contacts affixed to each of the slider assemblies serve to make electrical connections between the column commons and the digit common in accordance with the data of the badge sensed by the hole sensing

projections of the slider assemblies as a badge is being inserted into the badge reader.

The operation of the badge-reading apparatus will be clear from the following detailed description.

## Detailed Description—Badge-Reading Apparatus

While the badge-reading apparatus of the instant embodiment of the invention has a capacity for reading up to ten columns on a badge, it will be obvious from the following description that the capacity of the badge-reading apparatus is merely exemplary and that the capacity can be varied without departing from the invention.

As shown in Figures 1 and 2, the badge-reading apparatus is provided with a receiver for receiving badges that are to be read. A receiver throat is formed by a rear guide member 10 and right side guide 10a, a front guide member 11 and left side guide 11a. The rear guide member 10 is cut away in the central portion to enable the badges to be fully inserted into the badge receiver. The upper ends of the side guides 10a and 11a are rounded to facilitate the placing of the badges into the badge receiver.

The right rear side frame 12 and left rear side frame 13 are held in parallel spaced apart relationship by means of the support bars 14 and 15. The rear guide member 10 is fixed to the rear side frames 12 and 13. The right front side frame 16 and left front side frame 17 are held in parallel spaced apart relationship by means of the support bars 18 and 19. The front guide member 11 is fixed to the front side frames 16 and 17. The front frame assembly is hinged to the rear frame assembly by means of the hinge plates 20 and shaft 21.

The front plate 22 is held in fixed relationship by means of the screws 23. Front plate 22 is made of dielectric material. The lower portion 22a of the front plate 22 has ten guide slots. Embedded in back of the guide slots is a column commons conductive array comprising ten vertically disposed conductor elements, one for each of the corresponding data columns of the badge. The upper portion 22b of front plate 22 is raised and contains ten guide grooves adapted to accommodate the slider assemblies 24 (see Figure 3), one for each of the corresponding data columns of the badge. The badge abutment plate 25 is slideably mounted in the front frame assembly and has a pin 26 that projects through the slot 22c in front plate 22. The badge abutment plate 25 is biased and in an upward direction by means of spring 27 that is attached to pin 28 which is fixed to front plate 22.

The rear plate 29 is attached to support bars 14 and 15. Rear plate 29 is made of dielectric material. Rear plate 29 has an upper portion 29a having ten slider guide grooves which function to guide the slider assemblies 24. The lower portion of rear plate 29 has embedded therein a digit commons conductive array comprising ten horizontally disposed conductor elements 30, one for each of the digits 0 through 9, otherwise referred to as digit commons.

Referring to Figure 3, the slider assembly 24 is shown to be comprised of a hole sensing projection 24a, a spring 24b, and the bifurcated contacts 24c.

As the badge 31 is introduced into the badge receiver of the badge reading apparatus, the right-hand edge will strike detent 32 which is pivotally mounted on right front side frame 16, forcing it outwards, by overcoming the pressure of spring 33. Continued downward movement of the badge will cause the bottom edge of the badge 31 to strike the abutment member 34 which is fastened to the abutment plate 25, thereby moving the abutment plate 25 in the downward direction. The downward movement of abutment plate 25 releases its holding pressure on the slider assemblies 24. The pressure of springs 24b will urge the badge sensing projections 24a into contact with the surface of the badge 31. With the continued downward movement of the badge 31, the ten sensing projections 24a will sense for character representing holes in the badge 31. Upon encountering a hole, the sensing projection 24a will be urged into the hole due to the pressure of spring 24b. With the continued downward movement of the badge 31 and as the sensing projections 24a encounter a character representing hole, the slider assemblies 24 will be likewise moved in a downward direction within their guide grooves until such time that the abutment plate 25 strikes the stop screw 35. As the badge 31 approaches its lowest position within the badge receiver, the lower edge of the badge 31 will strike the latch lever 36 (see Figures 2 and 5), which protrudes through the opening 29b in the rear plate 29, camming it in an outward direction against the tension of spring 37. With the badge 31 reaching its lowest position within the badge receiver, the latch lever 36 will enter the latch hole 31a (see Figure 4), thereby latching the badge 31 in the reading position. The badge 31 in being fully inserted into the badge receiver of the badge-reading apparatus will have moved the slider assemblies 24 to a position which is in accordance with the data codally stored in the badge 31.

Referring to Figure 3, the bifurcated spring contacts 24c serve to electrically connect the column commons 38 with one of the digit commons 30 in accordance with the character representations in the badge 31 as sensed by the sensing projections 24a. Under the control of programming equipment (not

shown) and connected to the badge-reading apparatus by means of the electrical cable 39 (Figure 1), the column commons 38 may be selectively energized in sequence. In accordance with the electrical circuits completed by the bifurcated spring contacts 24c, the character representing signals occurring on the digit commons 38 can be electrically connected to other data storing media (not shown).

After the reading of the badge 31, the badge 31 may be electromagnetically released by electrically energizing the electromagnet 40 which causes the latch lever 36 to be withdrawn from the latch hole 31a in the badge 31. There is also provision for the manual release of the badge 31 from the badge reading position which can be accomplished by actuation of the manual release push button 41 that will also cause the latch lever 36 to be withdrawn from the latch hole 31a in the badge 31. When the latch lever 36 is withdrawn from the latch hole 31a, the badge 31 will be ejected from the badge receiver through the action of spring 27 which causes the abutment plate 25 to be restored to its uppermost slideable position. In returning to its uppermost position, the abutment plate 25 will carry with it the slider assemblies 24. With the abutment plate 25 in its uppermost position, the detent 32 will engage the abutment member 34 latching it in the restored position. The badge-reading apparatus is now in condition to receive the next badge that is to be read.

WHAT WE CLAIM IS: —

1. Data sensing apparatus for sensing data recorded in the form of holes in discrete areas of a sheet, in which the sheet passes a row of sensing pins which closely engage the holes and are moved thereafter by the sheet whereby the data is sensed by determining the position of the pins when the sheet reaches a predetermined location.

2. Data sensing apparatus as claimed in Claim 1 wherein the sheet is arrested at the predetermined location.

3. Data sensing apparatus as claimed in Claim 1 or Claim 2 including a set of row conductors and a set of column conductors, in which each sensing pin is attached to a member carrying contacts which, when the sheet reaches the predetermined location, connect one of the column conductors to one of the row conductors in accordance with the position of the hole with which the pin is engaged.

4. Data sensing apparatus as claimed in Claim 3 wherein one of the contacts on each member slides along an associated column conductor as the sheet is moved towards the predetermined location and another of the contacts on each member contacts the row conductors sequentially until the sheet reaches the predetermined location.

5. Data sensing apparatus as claimed in Claim 3 or Claim 4 including means to test the connections between the row and column conductors sequentially and derive output signals in accordance with the connections tested.

6. Data sensing apparatus as claimed in any of the previous claims including a retaining device to retain the sheet in position when it reaches the predetermined location.

7. Data sensing apparatus as claimed in Claim 6 including means to disengage the retaining device to release the sheet and an ejecting device to eject the sheet from the apparatus.

8. Data sensing apparatus substantially as described with reference to the accompanying drawings.

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Agent for the Applicants.

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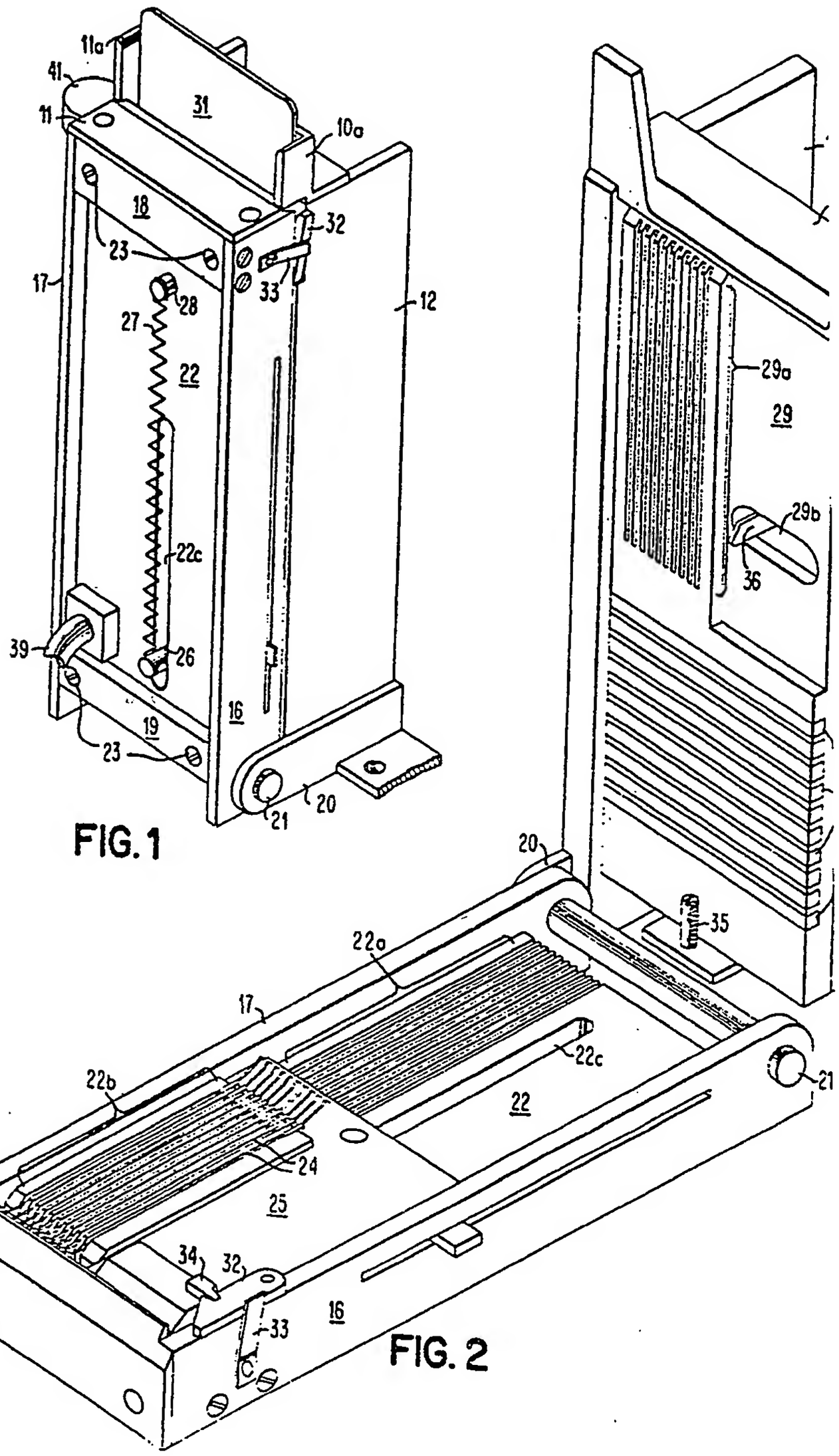
11a
41
11
31
10a
18
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28
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12
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22c
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19
23
21
20
29a
29
29b
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22a
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22c
22b
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33

FIG. 1

FIG. 2

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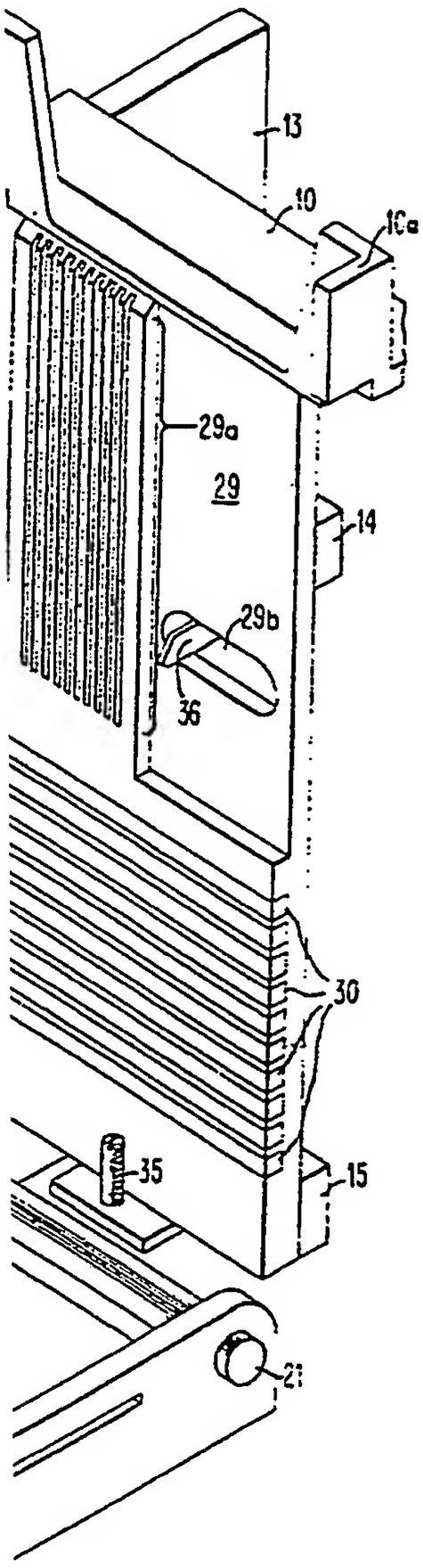
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 1 & 2



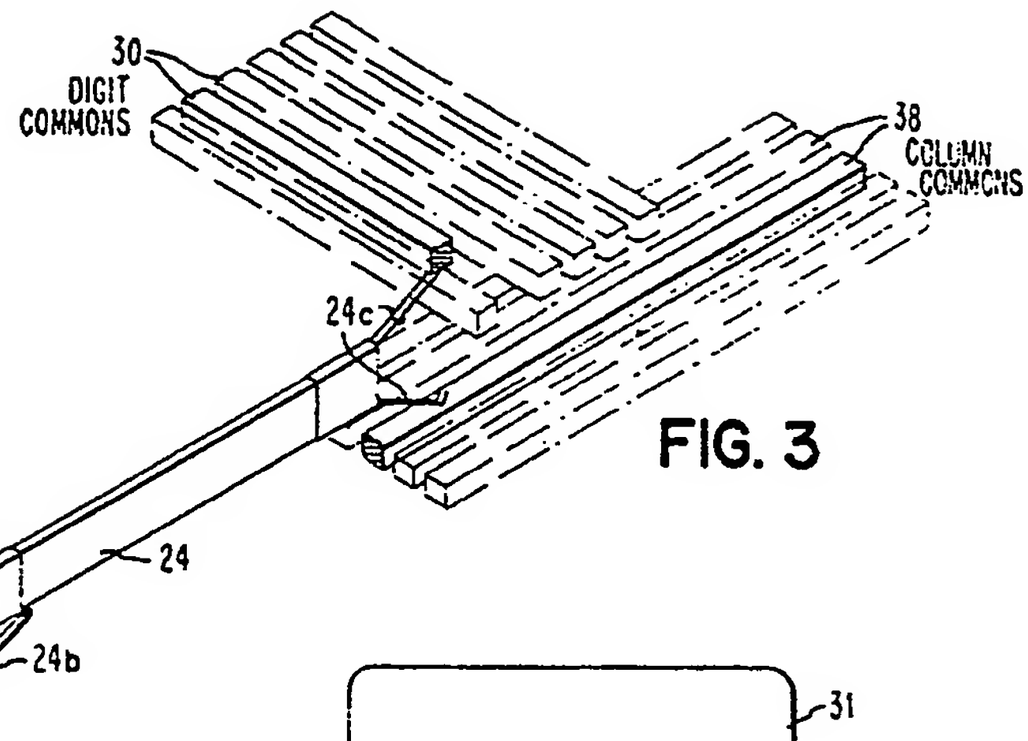




FIG. 3

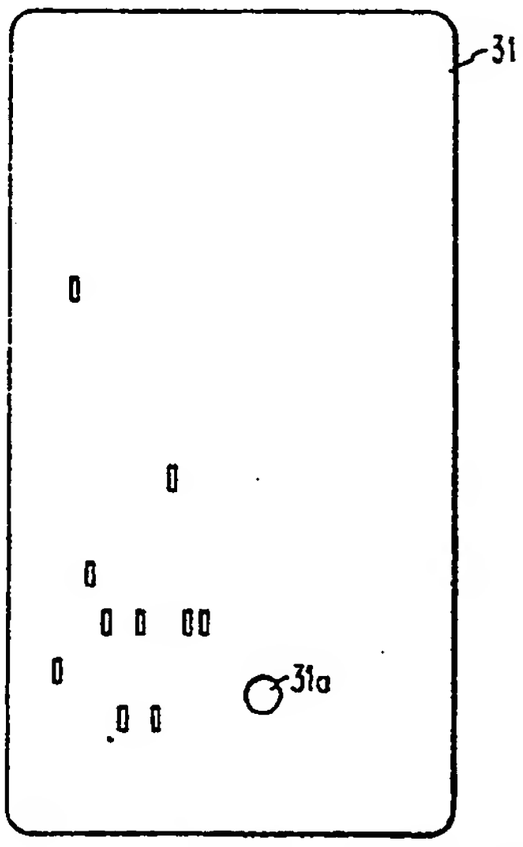



FIG. 4

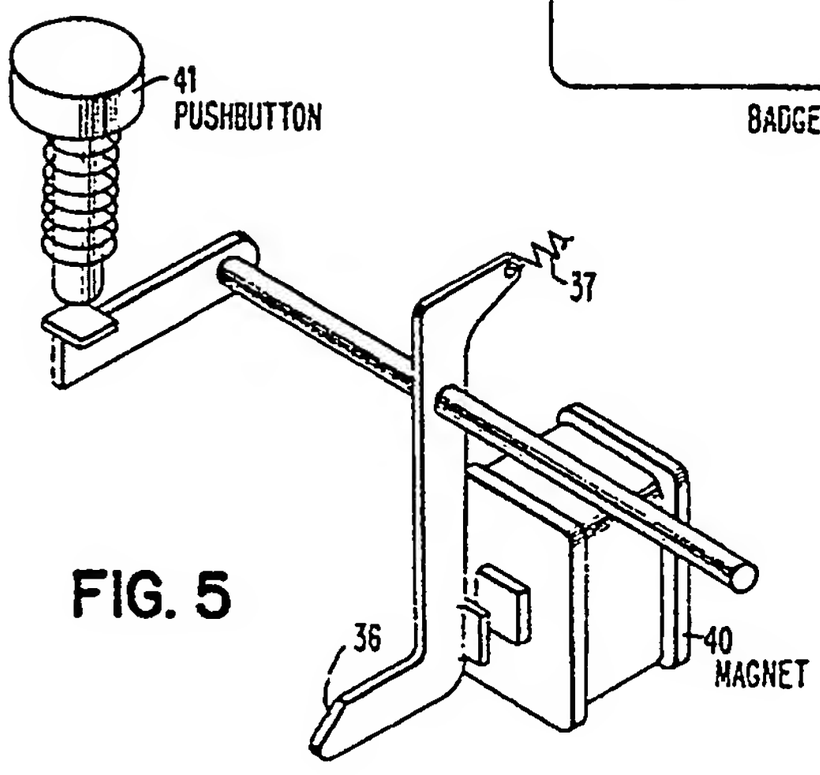



FIG. 5

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2 SHEETS *This drawing is a reproduction the Original on a reduced sca*

Sheets 1 & 2

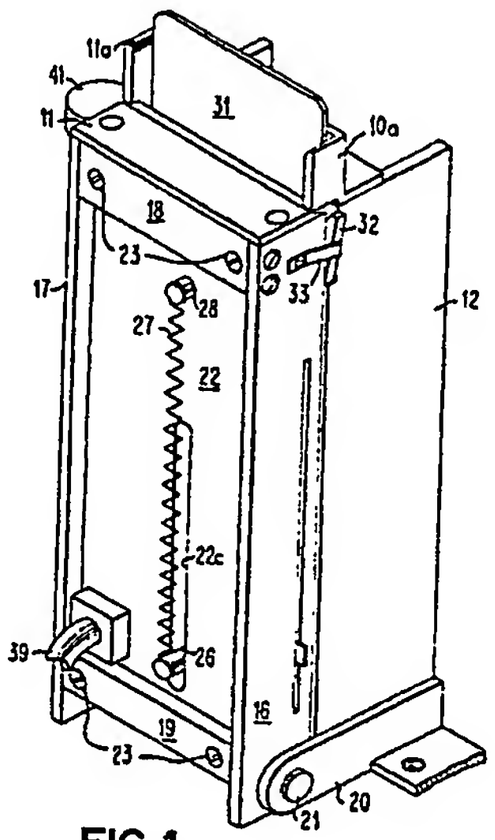
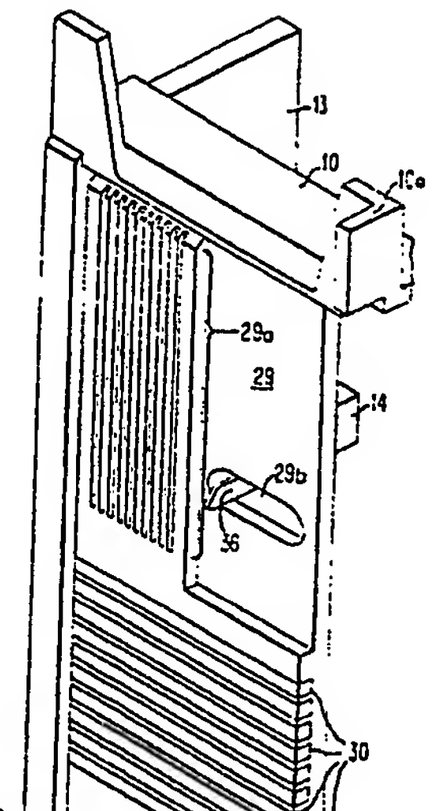



FIG. 1



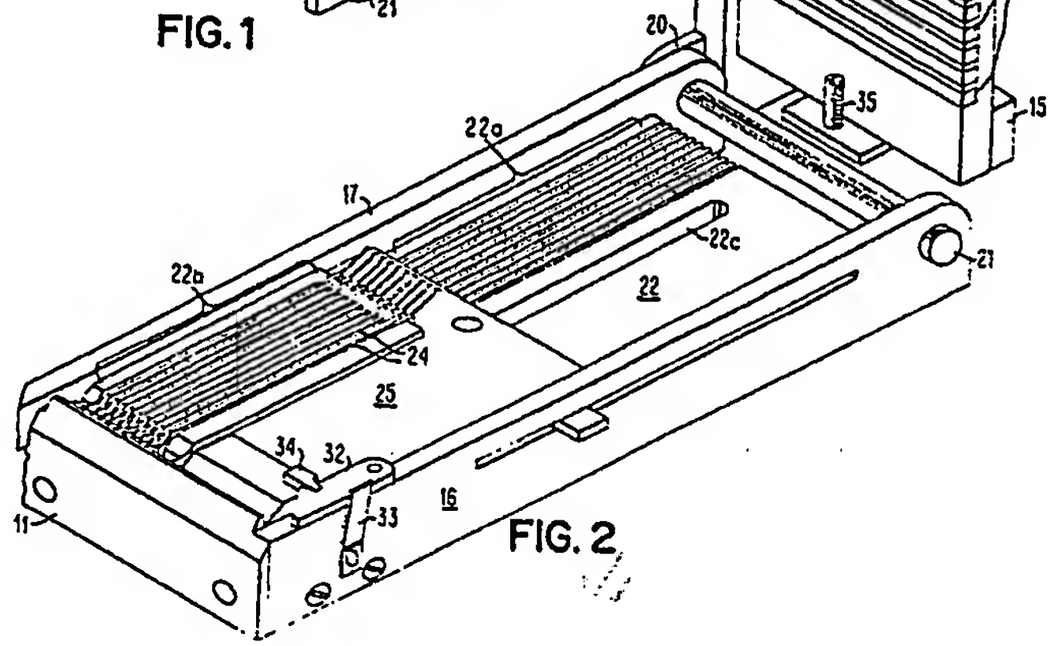




FIG. 2

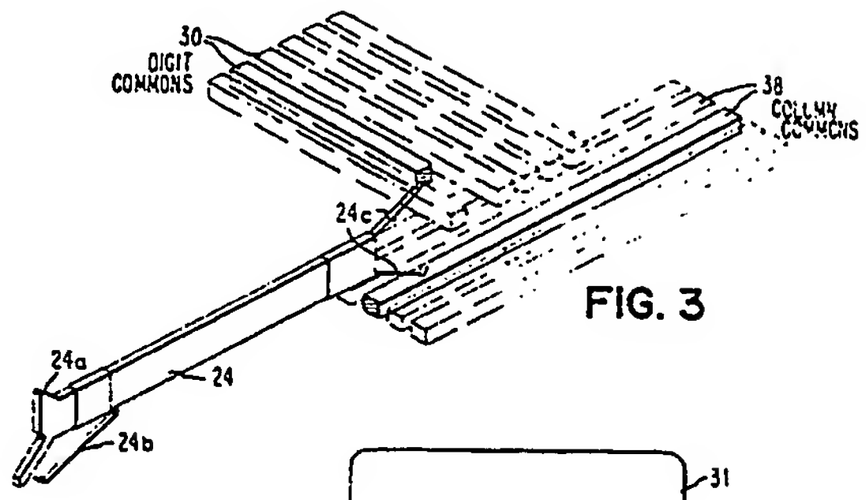



FIG. 3

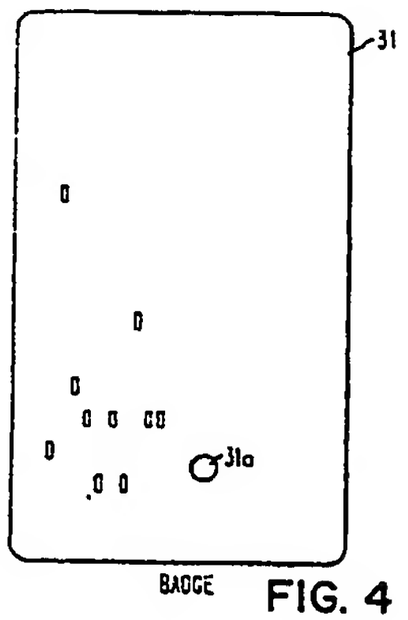



FIG. 4

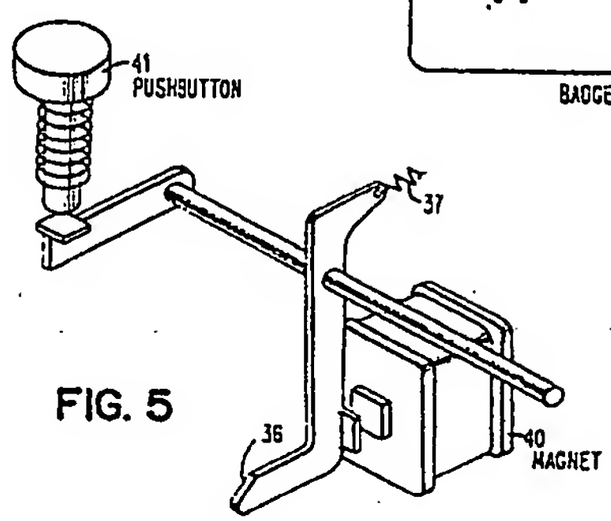



FIG. 5